

National Science Foundation Wire Pool

Wire Maintenance Policy (Lubrication Policy)

INTRODUCTION

Wire rope and cable distributed by the Wire Pool is a National Science Foundation (NSF) resource that shall be maintained by the vessel operators accepting wire from the Pool. Regular maintenance of these tension members as prescribed below is required so as to increase their operational life.

It is understood that maintenance of NSF tension members can be time consuming and costly. The cost of regular maintenance, however, is small compared to the costs associated with tension member replacement or delays due to tension member performance issues, such as hocking or parting that can result in dangerous situations and/or equipment loss.

The frequency of wire and cable maintenance will depend on many operational factors including the extent to which the wire is used, and the exposure it has to the elements and salt spray, and will likely need to increase as the tension member continues to be used. Zinc coatings will deteriorate as the wires “work” in unison under varying loads wearing away the galvanizing and exposing unprotected steel wires to salt water and salt spray. A lubricant/corrosion inhibitor will need to be applied more frequently as the protective galvanized surface breaks down.

How often a cable or wire should be lubricated is difficult to specify. One case, which helps to put a limit on the frequency of lubrication, involved a UNOLS global class vessel with a new length of .681” power optic cable that was placed in service on the vessel in January 2012. The new cable had been lubricated just prior to going on the vessel. Worth noting here is that the winches on this global class vessel are located in the interior of the ship where the cable is not exposed to the elements when not in use. After 16 months and 86 casts the cable was in need of re-lubrication, which was done while the vessel was in port in May 2013. Since not all vessels have the benefit of storing their wire and cable below decks this represents a best-case scenario. If under these optimal conditions and regular use the cable was in need of re-lubrication after 16 months one could conclude that re-lubrication after 12 months would be reasonable particularly if the tension member had more exposure to the elements.

Although it is in the best interest of the vessel crew and scientific users to have all tension members properly maintained, it might be difficult to accomplish on a regular basis. Preference may need to be given to the most valuable tension members in terms of their replacement costs (i.e. .681 Power Optic cable, .680 Coax cable) and to those on which the vessel relies to regularly carry out its scientific mission (i.e. .322 EM cable or trawl wire)

IN SERVICE REQUIREMENTS

New wire ropes and cables being installed on a vessel shall have a lubricant/corrosion inhibitor applied at the time they are wound onto the ship's winch using an acceptable lubrication method.

Wire and cable that remain in use on the vessel should be maintained on a regular basis. Wire maintenance activities include (1) cleaning the tension member of scale, dirt, salts, oxides, etc., (2) a pressurized fresh water wash, (3) air-drying, and (4) application of a lubricant/rust preventative. The wire should be maintained at a minimum on a monthly basis or at the conclusion of a wire/cable use during a cruise. It may not be possible to do all of the above every time wire maintenance is performed but undertaking some maintenance activity (i.e. fresh water wash) is better than doing nothing.

Efforts shall be made to rinse the tension members during re-haul using fresh water spray to dilute and reduce salts in entrained water. Spray allows for maximum affect with a minimal water volume. Although rinsing after every deployment is preferable, vessels with limited fresh water storage capacity may find it necessary to adopt a wash-down policy that is consistent with the availability of fresh water.

During extended periods of inactivity, winch drums should be periodically rotated to a new resting position to avoid the concentration of corrosives at the bottom of the drum.

The maintenance activities noted above may actually be conducted simultaneously depending on the equipment used. With the appropriate equipment and set up, it may be possible to conduct regular maintenance at sea while the tension member is recovered following a deep water lowering. Maintenance shall be done in port if at-sea maintenance is not possible.

The longer a tension member is in service; it will likely require more frequent application of a lubricant/corrosion inhibitor. Wire ropes and cables that show signs of corrosion, be it iron oxide or even zinc oxide (white rust) due to the break down of the galvanizing and/or appear dry where previously applied lubrication is no longer present, shall be re-lubricated. Based on previous experience a tension member shall undergo lubrication at a minimum of once every 12 months.

Used wires and cables shall be lubricated at the time they are wound onto a vessel if they had not been lubricated within the past 12 months or if it will be difficult to apply lubricant/corrosion inhibitor when it is next due.

LUBRICANT/CORROSION INHIBITOR REQUIREMENTS

The lubricant/corrosion inhibitor shall meet the U.S. Environmental Protection Agency requirements issued in the Vessel General Permit For Discharges Incidental To The Normal Operation of Vessels (VGP) dated 19 December 2013. Specifically, section 2.2.9 indicates that "All vessels must use an EAL in all oil to sea interfaces, unless technically infeasible. "Environmentally acceptable lubricants" means lubricants that are "biodegradable" and "minimally-toxic" and are "not bio-accumulative" as defined in Appendix A of this permit".

The product used shall be a low viscosity corrosion inhibitor that provides a surface coating as well as penetrates to the inner strands of EM cable and wire rope for protection throughout the

tension member. It shall be non-flammable and not contain any solvents or hazardous materials. The product must have a proven record as a lubricant/corrosion inhibitor for submerged cables and wire ropes used in the ocean environment. See Attachment 1 for environmentally acceptable lubricants according to the definitions and requirements of the US EPA Vessel General Permit.

STORAGE REQUIREMENTS

Wire and cables are periodically removed from vessels and placed in storage for varying periods of time. Tension members that are too short for one vessel but suitable for another UNOLS vessel could be in storage for an extended period before being reassigned. Wire or cable that is removed so that another tension member can be temporarily utilized may only be in storage for a short time before they are returned to the vessel. [Some cables are replaced due to their general poor condition but may have several thousand meters of length that is in very good condition because it seldom came off the winch drum] A lubricant/corrosion inhibitor shall be applied during off spooling if the tension member will be placed in storage for an undetermined period of time or if the expected storage period will extend beyond 12 months since the last lubrication.

A tension member placed in storage shall be kept under cover. If inside storage is not possible, the reel shall be protected either by reel lagging, or covered in some manner such as by a tarp or with shrink-wrap material leaving adequate space around the wire and the bottom open for ventilation.

REPORTING REQUIREMENTS

All wire maintenance reports shall be uploaded in the UNOLS wire database for the respective tension member. Documented maintenance practices employed for existing tension members will be taken into consideration when evaluating new requests for new wire and cable.

UNOLS Wire Maintenance Requirements		
Event	Action	Frequency
New tension member being wound onto vessel winch	Application of lubricant/corrosion inhibitor using recommended appliance	As placed on vessel
Tension member previously in storage being wound onto vessel winch	Application of lubricant/corrosion inhibitor using recommended appliance	As placed on vessel unless wire was lubricated within the past 12 months
Tension member in use on vessel	Fresh Water Rinse	As often as after each use or at a minimum at the conclusion of the cruise or once per month which ever is shorter.
	Rotate drum to avoid concentration of corrosives at bottom of drum	At least once per month
	Wire cleaning and application of lubricant/corrosion inhibitor using recommended appliance	As needed and at least once every 12 months
Tension member being removed from vessel and placed in storage	Wire cleaning and application of lubricant/corrosion inhibitor using recommended appliance	When removed from the vessel
	Inside storage or, if outside, cover with reel lagging, tarp, shrink wrap or other manner to protect from weather but allow adequate ventilation around wire and bottom of reel	While stored

Attachment 1

The following is a list of some products that are classified as environmentally acceptable lubricants according to the definitions and requirements of the US EPA 2013 Vessel General Permit. This list is by no means comprehensive. It will be updated from time to time as other products are identified as VGP compliant.

- Grignard Company LLC OLL D-2
- Grignard Company LLC StranCore